

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

PATHOLOGY & MICRO BIOLOGY

Subject code – PAM201

Course Objectives: Demonstrate an investigative and analytic approach to clinical and pathological problems.

Demonstrate applied knowledge of Pathology, by describing the four aspects of the major disease processes covered in the course:

- 1) Cause (etiology)
- 2) Mechanisms of development (pathogenesis)
- 3) Functional consequences of the molecular and morphologic changes (clinical significance)
- 4) Apply the basic and clinically supportive sciences appropriate to pathology (such as anatomy, biochemistry, histology/histopathology, cytogenetics, and physiology).

Course outcome:

After completion of the study the student will be able to :

Gather and apply essential information from patient cases necessary to discuss clinic-pathologic processes in Small Group Discussions.

Develop a differential diagnosis when presented with clinical information or a histo-pathologic finding.

Utilize laboratory studies to diagnose and monitor disease states and conditions.

Demonstrate the ability to support self-education (i.e., active learning).

Demonstrate the ability to find additional information when confronted with a question or unfamiliar term, particularly when preparing for case-based exercises.

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| 1. Aims and objectives of study of pathology. | 2H |
| 2. Brief outline of cell injury, degeneration, necrosis and gangrene. | 3H |
| 3. Inflammation: Definition, vascular and cellular phenomenon difference between Transudate and exudates. Granuloma. | 4H |
| 4. Circulatory disturbances: Hemorrhage, Embolism Thrombosis Infraction, shock, Volkmann's ischemic contracture. | 4H |
| 5. Blood disorder: Anemia, Bleeding disorder. | 3H |
| 6. CVS: Heart and Blood vessels, Coronary heart disease. | 3H |
| 7. Respiratory System: Ch. Bronchitis, Asthma Bronchiectasis, Emphysema, COPD etc. | 5H |

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| 8.Bones and Muscles: Arthritis & Spondyloarthropathy. | 3H |
| 9.PNS and Muscles: Neuropathies, Poliomyelitis & Myopathies etc. | 4H |
| 10.CNS: Infection, Demyelinating disease, Degenerative disease etc. | 4H |
| 11.Neoplasia. | 3H |
| 12.Growth and its disorders like hypertrophy hyperplasia & atrophy. | 3H |
| 13.Autoimmune diseases. | 3H |
| 14.Healing and repair. | 3H |
| 15. Diabetes mellitus and gout | 3H |

MICROBIOLOGY

Course Objectives: Students in this course will be asked to participate in a variety of course assessment activities. Some of these activities will occur periodically and will be not be graded. The goal is to gather evidence to determine whether the course is accomplishing the defined Microbiology learning outcomes. Ultimately these assessment activities will contribute to improving the course and enhancing knowledge .

Course outcome:

After completion of the study the student will be able to :

This class investigates new and exciting material about microbes and our world, including health concerns, microbial anatomy and physiology, genetics, epidemiology, and use of antimicrobials and disinfectants.

- 1) Compare and contrast the characteristics for various microbes with regards to infections, treatment, and control. (This includes prions, viruses, bacteria, protozoans, and multicellular parasites.)
- 2) Explain the dynamics of commensal, opportunistic, and pathological relationships particularly between microbes and humans
- 3) Evaluate and apply the proper methods of microbial control necessary in sample scenarios or case studies

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4) Describe microbial metabolic pathways in general terms and specifically evaluate the implications for food production and human disease.

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| 1. Introduction and History of Microbiology | 3H |
| 2. General lectures on Microorganisms (brief). | 3H |
| 3. Sterilization and asepsis. | 3H |
| 4. Infection- Source of infection and Entry and its Spread | 4H |
| 5. Immunity- Natural and Acquired | 4H |
| 6. Allergy and hypersensitivity. | 3H |
| 7. Outline of common pathogenic bacteria and diseases produced by them. | |
| 1. Respiratory tract infections. | 3H |
| 2. Meningitis. | 2H |
| 3. Enteric infections. | 3H |
| 4. Anaerobic infections. | 3H |
| 5. Urinary tract infections. | 3H |
| 6. Leprosy, tuberculosis and miscellaneous infections. | 3H |
| 7. Wound infections. | 2H |
| 8. Sexually transmitted diseases. | 3H |
| 9. Hospital acquired infections. | 4H |
| 8. Virology- virus infections with special mention of Hepatitis. | 4H |
| 9. Poliomyelitis & rabies. | 4H |

Textbook:

1) Textbook of Pathology, Harsh Mohan, Ivan Damjanov, Jaypee,

All chapters

2) Textbook of Microbiology, R. Ananthanarayan, All chapters.

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PHARMACOLOGY Subject code - PHA201

1. **General Pharmacology:**-Introduction and definitions, Nature and sources of drugs: Dosage forms of drugs. Routes of drug administration, Pharmacokinetics (Absorption, Bioavailability, Distribution, Metabolism Excretion, First order Zero order Kinetics); Pharmacodynamics (sites and mechanisms of drug action in brief, Adverse drug reactions, Margin of safety of drugs and factors influencing dosage and drug response) **12H**
2. **Drugs Affecting ANS:**-General Introduction, Drug affecting parasympathetic nervous system, Drug affecting sympathetic nervous systems. **10H**
3. **Drugs Affecting Peripheral (Somatic) nervous System:**- Skeletal Muscle Relaxants: Local Anesthetics. **10H**
4. **Renal and CVS:**- Diuretics; Renin-angiotension system and its inhibitors, Drug treatment of Hypertension, Angina pectoris, Myocardial infarction Heart failure, and hypercholesterolemia. **10H**
5. **Anti-inflammatory drugs and related autacoids:**- Histamine, Bradykinin, 5-HT and their antagonists; Prostaglandin's and leukotrienes; Nonsteroidal-Anti-inflammatory drug, Antirheumatic drugs and drugs used in gout. **10H**
6. **Drugs Affecting CNS:**-General anesthetics, Anxiolytics and hypnotics; Alcohol, Opioid analgesic Drug dependence and abuse Antiepileptic drugs, Drug therapy for Neurodegenerative disorders. **10H**
7. **Endocrines:**- Parathyroid hormone, Vitamin D, calcitonin and drugs affecting Calcium balance, Thyroid and antithyroid drugs; Adrenocortical and anabolic steroids, Insulins and Oral Hypoglycaemic agents. **10H**
8. **Drugs Affecting Respiratory System:**- Drug therapy of bronchial asthma and chronic obstructive pulmonary disease. **10H**
9. **Chemotherapy:**- Introduction; sulfonamides, Fluoroquinolones, Penicillins, Cephalosporins, newer B-lactam antibiotic, aminoglycosides Macrolides and Newer antibiotics, Tetracyclines Chloramphenicol, Chemotherapy of Tuberculosis and leprosy, antiseptics-disinfectants. **10H**
10. **Miscellaneous Topics:**- Management of stroke, Toxicology and heavy metal poisoning, special aspects of paediatric and geriatric pharmacology; Drug interactions with drugs commonly used by physiotherapists; Hematinics, vitamins and antioxidants. **8H**

TEXTBOOK: Essentials of Medical Pharmacology, K.D. Tripathi, Jaypee, All chapters.

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EXERCISE THERAPY-II

Course Objectives: This area offers students a life span approach to physical fitness, performance and health to prepare them for a career in the physical therapy field. Exercise therapy study is designed to expand upon information provided in the basic sciences of anatomy/physiology and chemistry. By design students learn about the effects of physical activity on children, then young adults, followed by geriatric populations. The exercise science majorly prepares students for a variety of possible careers in athletic training, physical therapy, fitness and sport enterprises, education, sport science & coaching. Such occupations include, aerobics instructor, cardiopulmonary rehabilitation specialist, exercise physiologist, occupational physiologist, personal trainer, strength and conditioning specialist and more.

Course Outcome:

Upon successful completion of the program, students will be able to:

Demonstrate a sound foundational knowledge and understanding of the principles of biology, chemistry, and nutrition, and an advanced understanding of human anatomy and physiology as they relate to responses and adaptations to physical activity and exercise.

Demonstrate basic laboratory skills pertaining to assessments, laboratory methods, sound experimental and analytical practices, data acquisition and reporting in the exercise sciences.

Demonstrate knowledge of the importance and influence of physical activity, kinesiology, nutrition and exercise on health and be an advocate for physically active lifestyles as a means to improve quality of life and reduce the risk and prevalence of lifestyle related diseases.

Plan, administer, and evaluate wellness and fitness programs, nutrition projects, and exercise physiology tracks based in sport, clinical, industrial, and/or corporate environments.

Demonstrate requisite skills and abilities for meaningful employment in exercise science related areas or pursue graduate studies in an exercise therapy related area.

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| Unit wise PLAN | | |
| Subject Name : Exercise Therapy-II (Theory) | | Subject Code - EXT201 |
| Year - Second Year | | Total Hours : 100 Hrs |
| UNIT No. | Topics | Hours |
| 1 | Therapeutic exercises – impact on physical function, classification, techniques, indications, contraindications, assessment and evaluation of patient. Range of motion & types of ROM exercises Resistance exercises and adaptation of skeletal muscles | 15H |

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| 2 | Principles of aerobic exercises & its physiological response, testing as basis of aerobic program Determinants of exercise program. Stretching Techniques and its determinants. Peripheral and spinal joint mobilization techniques. Individual, group and mass exercises, maintenance exercises, plan of exercise-therapy tables and schemes | 25H |
| 3 | Functional Re-education- techniques to re-educate ADL functions. Principles of Traction, physiological and therapeutic effects, classification, types, indications, contraindications, techniques of application, operational skills and precautions. Taping and bandaging techniques. P.N.F: Detail theory of proprioceptive-neuro muscular facilitation techniques. Co-ordination Exercises: Definition of coordination movements. Incoordinated movements, Factors for coordinated movements, technique of coordination exercises. Techniques to improve static and dynamic balance. | 26H |
| 4 | Posture: Types, factors responsible for good posture, factors for poor posture, principles of development of good posture, assessment of Posture. Gait: Analysis of normal gait with muscle work, various pathological gaits. 2point, 3point & 4point gait: Introduction, crutch measurement, crutch balance, various types of crutch gait in details. Breathing exercises: Physiology of respiration, types of breathing exercises, technique if various types of breathing excises, its effects and uses. Pulmonary exercises & postural drainage | 20H |
| 5 | Hydrotherapy: Introduction, various types of hydrotherapy units, construction and equipments used in hydrotherapy Principles, indications, contraindication, effects and uses of hydrotherapy. Precautions towards patient, towards therapist, equipment unit etc. Exercises for normal person – Importance and effects of exercise to maintain optimal health and its role in prevention of disease. Exercise prescription for different age groups/ occupational demands etc. Yoga-Definition-History-Principles-Concepts, General effects of yogic posture on the body. | 14H |

Text Books: M.Dena Gardiner, Principles Of Exercise Therapy. CBS, all chapters

Suggested Readings –

1. Therapeutic Exercises- foundations and Techniques- Kisner and Colby.
2. Muscle Testing and Function- Kendall
3. Principles of exercise therapy – Gardiner.
4. Practical Exercise Therapy – Hollis.
5. Beard's Massage – Wood.

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6. Motor control- theory and practical application- Shumway.
7. Hydrotherapy – Principles and practice – Campion.
8. Measurement of Joint Motion – A guide to goniometry – Norkin and White Davis.

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LECTURE WISE PLAN

Subject Name : Exercise Therapy-II (Practical)

Subject Code - EXT291

Year - Second Year

Total Hours : 100 Hrs

| S.No. | Topics | Hours |
|-------|--|-------|
| 1 | Assessment and evaluative procedures including motor, sensory, neuromotor coordination, vital capacity, limb length. | 10H |
| 2 | Resistive Exercise. | 10H |
| 3 | Range of motion exercise. | 10H |
| 4 | Stretching. | 10H |
| 5 | Traction techniques. | 5H |
| 6 | Functional re-education. | 10H |
| 7 | Taping and bandaging techniques. | 5H |
| 8 | Assessment of Posture using plumb line. | 5H |
| 9 | Assess and evaluate equilibrium/ balance and techniques to improve balance. | 5H |
| 10 | Peripheral Joint Mobilization techniques. | 10H |
| 11 | Breathing exercise and postural drainage | 10H |
| 12 | Gait and crutch walking | 5H |
| 13 | Application of PNF techniques and patterns. | 5H |

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ELECTROTHERAPY – II

Subject code - ELT201

Course Objectives: This course is an ideal way to bring up to date with current procedures in this field. It will expand the knowledge of the underlying principles of modalities such as ultrasound and laser therapy and will enhance the ability to adapt 'standard' treatment protocols to the specific needs of each individual patient.

Course Outcome:

At the end of the course students are able to:

- To consider the basic issues of each modality
- What the energy can (and cannot) do in terms of physiological & therapeutic effect
- To relate these issues to both the research evidence & to the clinical application of each modality
- Explain the basic nature of the applied energy
- Identify the key physiological effects of the modality
- Rationalise the main therapeutic effects
- Justify the appropriate clinical application
- Establish appropriate clinical doses
- List the key contraindications, dangers & precautions

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| UNIT wise plan | | |
| Subject Name : Electro Therapy-II (Theory) | | Subject Code - |
| ELT201 | | |
| Year - Second Year | | Total Hours : |
| 100 Hrs | | |
| UNIT No. | Topics | Hours |
| 1 | MEDIUM FREQUENCY CURRENT (interferential current) | 30H |
| | Definition, characteristics, physiological/therapeutic effect of I.F current, indication, technique of application, contraindication and precaution. | |
| | HIGH FREQUENCY CURRENT | |
| | a. SHORT WAVE DIATHERMY - Introduction, physiological effect and therapeutic effect of SWD, method of application (capacitor field method and cable method etc.) technique of treatment, indication, contraindication and dangers. | |
| | b. PULSED SWD - Definition, characteristics, mechanism of work, physiological effect and therapeutic effects, indications, techniques of application, principle of treatment and contraindication. | |
| | c. MICROWAVE DIATHERMY - | |
| · Introduction and characteristics. | | |

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| | <ul style="list-style-type: none"> · Physiological effect. · Therapeutic effect · Techniques of application and principle of treatment. · Dangers of microwave diathermy | | | |
| 2 | LASER | 25H | | |
| | <ul style="list-style-type: none"> · Introduction and characteristics. · Effect on tissue. · Therapeutic effect · Indication, contraindication and dangers. | | | |
| | ULTRASONIC THERAPY | | | |
| | <ul style="list-style-type: none"> · Introduction and characteristics. · U.S therapy parameters. · Coupling media · Therapeutic effects. · Indications, contraindications and dangers. · Testing of apparatus · Technique of application and dosage | | | |
| | CRYOTHERAPY | | 25H | |
| | <ul style="list-style-type: none"> · Introduction, physical principles · Physiological effects · Indication and contraindication · Therapeutic effects and technique of application | | | |
| | BIO-FEEDBACK | | | |
| | <ul style="list-style-type: none"> · Introduction, principles of bio-feedback · Therapeutic effects of bio-feedback · Indication and contraindication · Technique of treatment | | | |
| | Electro diagnosis- EMG and ENG studies, techniques etc. | | | 20H |
| | ADVANCED ELECTROTHERAPY | | | |
| Combined therapy-principle, therapeutic uses and indication like U.S therapy with stimulation or TENS etc. | | | | |

Text Books: 1) Basanta Kumar Nanda, Electrotherapy simplified, jaypee, all chapters.

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2) Angela Forster, Clayton's Electrotherapy, CBS , all chapters.

Suggested Readings

- 1) Low and Reed – Electrotherapy Explained: Principles and Practise
- 2) Jagmohan Singh – Textbook of Electrotherapy.
- 3) Kahn - Principles and Practises of Electrotherapy
- 4) Lehmann – Therapeutic Heat and Cold

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LECTURE WISE PLAN

Subject Name : Electro Therapy-II (Practical)

Subject Code - ELT291

Year - Second Year

Total Hours : 100 Hrs

| S.No. | Topics | Hours |
|-------|---|-------|
| 1 | Testing of Electrotherapy apparatus. | 10H |
| 2 | Technique of application of electrotherapy treatment modalities (demonstration and practice). | 50H |
| 3 | Electro-diagnosis (demonstration and practice of following electro-diagnostic measures) | 20H |
| | a. F.G test | |
| 4 | Observe EMG and NCV- demonstration only | 10H |
| 5 | Observe Biofeedback Unit. | 10H |

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Course Description

Community Medicine

Subject Code - COM201

COURSE OBJECTIVE:

- 1) Help Students understand health and potential interventions from a community/consumer perspective.
- 2) Provide opportunities for Students to develop skills in working collaboratively when addressing health issues.
- 3) Help community partners understand and use research skills to advance their own missions.
- 4) Experience the translation of research into action. Instill in students a sense of responsibility to the communities in which they work.
- 5) Take the skills developed through the community project to other settings in which the students may practice in the future

COURSE OUTCOME:

- 1) Education and training in community-based and collaborative research that will have transferability to other settings.
- 2) Strengthening relationships in the benefit of community-based projects of current and future students.
- 3) Advancing knowledge on community research experiences in a scholarly manuscript.

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UNIT WISE PLAN

Subject Name : Community Medicine (Theory)
COM201

Subject Code -

Year - Second Year

Total

Hours : 100 Hrs

| UNIT No. | Topics | Hours |
|-----------------|---|--------------|
| 1 | General concepts of health diseases, with reference to natural history of disease with pro-pathogenic and pathogenic phases. The role of socio-economic and cultural environment in health and disease. Epidemiology, definition and scope. Public health administration an overview of the health administration set up at Central and state levels. | 18H |
| 2 | The national health programme -highlighting the role of social, economic and cultural factors in the implementation of the national programme. Health problems of vulnerable groups-pregnant and lactating women, infants and pre-school children, occupational groups. Occupational Health-definition, scope occupational disease prevention of occupational disease and hazards. | 22H |
| 3 | Social security and other measurement for the protection from occupational hazard accident and diseases. Details of compensation acts. Family planning – objectives of national family planning programmes and family methods. A general idea of advantage and disadvantages of the methods. Mental health emphasis on community aspects of mental, role of Physiotherapy in mental health problems such as mental retardation etc. | 22H |
| 4 | Communicable disease- an overall view of communicable disease classifies according to principle mode of transmission role of insect and other factors. International health agencies. | 14H |
| 5 | Community medicine and rehabilitation epidemiology, habitat, nutrition, environment anthropology. a) The philosophy and need of rehabilitation b) Principles of physical medicine c) Basic principles of administration or organization Introduction to community health. | 24H |

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BIOMECHANICS & KINESIOLOGY

Subject code BIK201

Course Objectives: Kinesiology is not studied merely to incite our interest in a fascinating and mysterious subject. It has a useful purpose. We study kinesiology to improve performance by learning how to analyze the movements of the human body and to discover their underlying principles. The study of kinesiology is an essential part of the educational experience of students of physical education, dance, sport, and physical medicine. Knowledge of kinesiology has a threefold purpose for practitioners in any of these fields. It should enable them to help their students or clients

Course outcome:

At the conclusion of this chapter, the student should be able to:

1. Define kinesiology and explain its importance to the student of human motion.
2. Describe the major components of a kinesio-logical analysis.
3. Prepare a description of a selected motor skill, breaking it down into component phases and identifying starting and ending points.
4. Determine the simultaneous-sequential nature of a variety of movement skills.
5. Classify motor skills using the classification system presented.
6. State the mechanical purpose of a variety of movement skills.
7. Utilize methods of observation and palpation to identify the joints and basic muscle groups active in a movement skill.

COURSE CONTENTS:

I. ESSENTIAL CONCEPTS

15H

1. Motion and forces, Axis and planes, Mechanical lever, lever in Human body.
2. Force distribution-linear force, resultant force & equilibrium, parallel forces in one plane concurrent force.
3. Newton's law – Gravity and its effects on human body
4. Forces and moments in action
5. Concepts of static equilibrium and dynamic equilibrium
6. Composition and resolution of forces
7. Friction
8. Pulleys.

II Joint Structure and Functions

10H

- a) Basic Principles of joint structure and function.

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- b) Tissues present in and around joints including fibrous tissue, bone cartilage, connective tissue, ligaments, tendons etc.
- c) Classification of joints.

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| III Muscle Structure and Functions | 15H |
| a) Mobility and Stability functions of muscle | |
| b) Elements of muscle structures and its properties. | |
| c) Types of muscle contraction and muscle work. | |
| d) Classification of muscles and their functions | |
| e) Group action of muscles, coordinated movement. | |
| II. KINEMATICS and KINETICS CONCEPTS of following joints | 25H |
| Upper Extremity | |
| Scapulo-shoulder Joint | |
| Elbow Joint | |
| Wrist Joint & Hand | |
| Lower Extremity | |
| Hip & pelvis | |
| Knee joint | |
| Patello femoral joint | |
| Ankle and foot | |
| Temporomandibular joint | |
| III. Biomechanics of vertebral column | 10H |
| IV. BIOMECHANICS OF GAIT: | 15H |
| Gait cycle | |
| Spatio-temporal parameters of gait | |
| Kinematics and Kinetics of human gait | |
| Determinants of gait | |
| Gait deviations in various orthopedic/neurological conditions | |
| V. POSTURE: | 10H |
| Anatomical aspects of posture | |
| Factors affecting posture | |
| Assessment of Posture | |
| Types of Posture | |
| Postural deviation | |

TEXTBOOK: Kinesiology: The Mechanics and Pathomechanics of Human Movement, Carol A. Oatis, Jaypee, All chapters.